

The mystery of the fourth beat

F. van den Brink · I. Frenaij · R. van Tooren

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The ECG (see fig. 1 in the Question) shows a sinus rhythm of 97 beats per minute, a normal axis, a small QRS complex and only mild ST depression in all leads with slight elevation in aVR. Furthermore it shows a 4:1 ratio electrical alternans. During CPR, the patient suffered 3 left-sided and 5 right-sided rib fractures. As breathing caused negative intrathoracic pressure, the sternum collapsed shifting the heart to the left creating the 4:1 ratio electrical alternans. On intubation, a positive intrathoracic pressure was created causing the sternum to remain stable and the electrical alternans to disappear (Fig. 2). Although no definite cause for her out-of-hospital cardiac arrest has yet been found, a hereditary disease seems likely as her mother died suddenly of unknown cause at the same age. The patient made a full recovery.

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F. van den Brink (✉) · I. Frenaij · R. van Tooren
St Antonius Hospital,
Nieuwegein, The Netherlands
e-mail: floris.s.van.den.brink@gmail.com
e-mail: f.van.den.brink@antoniusziekenhuis.nl



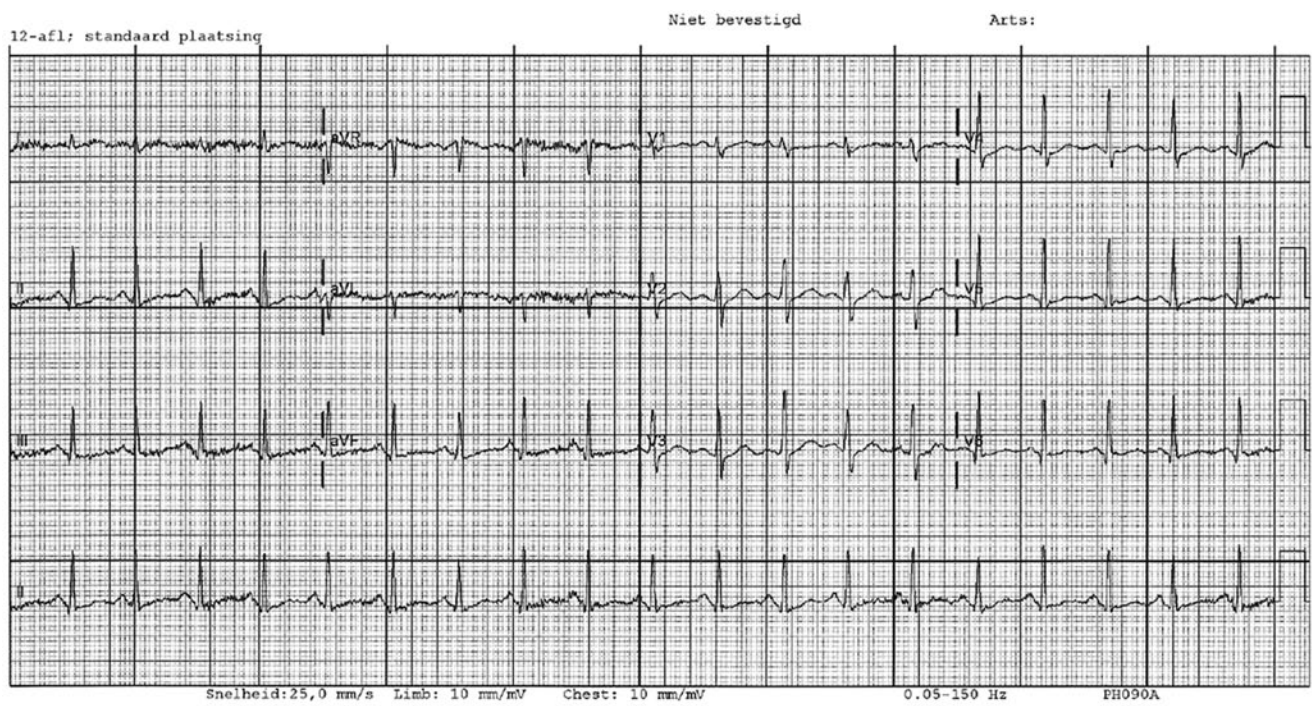


Fig. 2 ECG after intubation